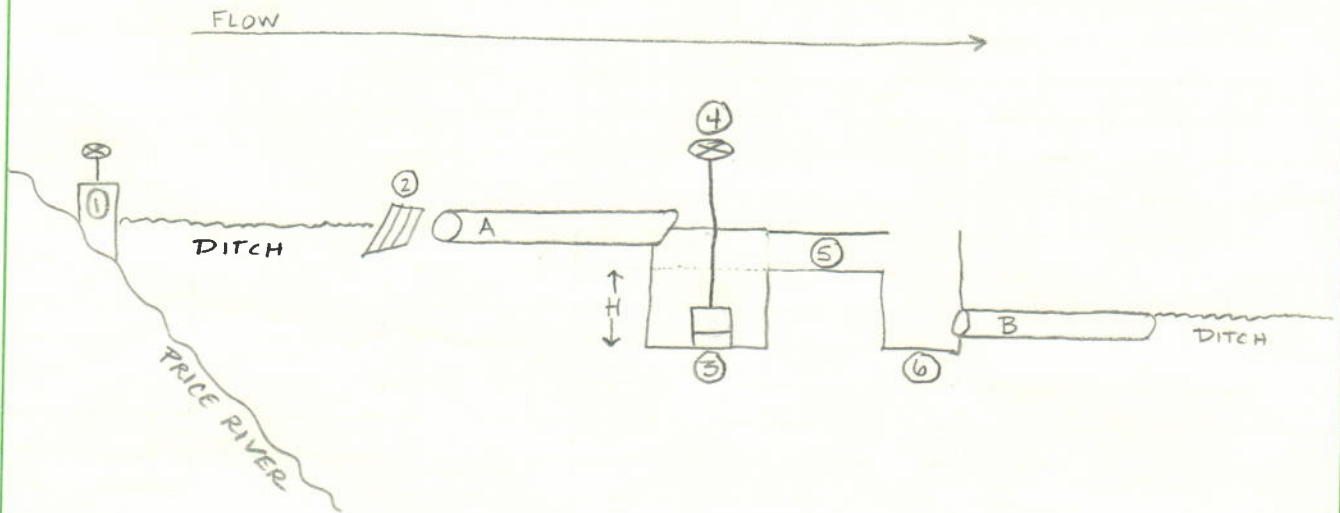


9/16/2008
GAY DITCH FLUME

1

SUE ODEKIRK, AARON HUNT AND DAVID HORSLEY ASSESSED THE GAY DITCH FLUME SITE. WE INTEND TO AUTOMATE MONITORING OF THE FLUME AND TO INSTALL TELEMETRY AT THE SITE FOR DATA COLLECTION.



① - DIVERSION DAM AND HEADGATE
OWNED BY CARBON COUNTY
FREQUENTLY WASHES OUT
BEAVER PROBLEMS

② - 8" GRATE LEANED AGAINST PIPE
SERVING AS TRASH RACK

A - 22" ID PIPE
SLOPE = 0.001 ft/ft

③ - CONCRETE SUMP

④ - SLUICE GATE USED TO REGULATE FLOW

H - $20\frac{1}{2}$ "

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GAY DITCH FLUME

2

- ⑤ - 9" PARSHALL FLUME (ACTULLY 8 ")
~ 50 YEARS OLD
GAGE IS BOLTED INTO THE THROAT
- SHOULD BE MOVED 4" TO READ @ $\frac{2}{3}$ THROAT
METAL IS STARTING TO CORRUDE

- ⑥ - CONCRETE SUMP DRAINED BY 14" ID PIPE

B - 14" ID PIPE

ASSESSMENT

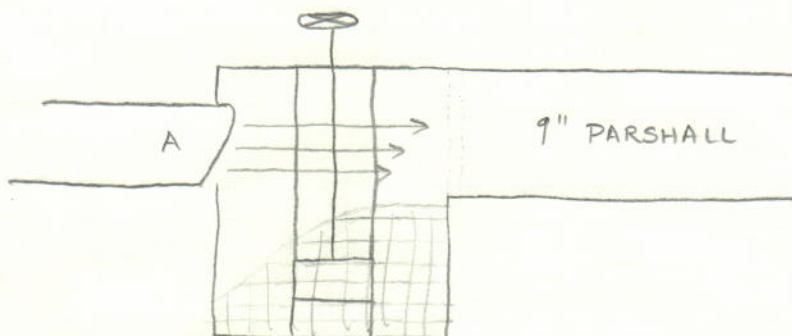
- FLUME MEASURED FLOW 28% LOWER THAN WE MEASURED USING THE MARSH MCBIRNEY CURRENT METER.
- WE WOULD LIKE THE ACCURACY IMPROVED BEFORE WE INSTALL THE AUTOMATED METER AND TELEMETRY.
- FOUR IMPROVEMENTS IDENTIFIED:
 1. RAISE THE FLOOR OF SUMP ③ UP TO THE FLOOR OF THE FLUME. THIS SHOULD REDUCE TURBULENCE IN THE FLUME.
 2. SLOW THE FLOW THROUGH PIPE A. POSSIBLY INLET FLOW COULD BE RESTRICTED THROUGH A SUBMERGED ORIFACE. ALTERNATIVELY BAFFLES COULD BE INSTALLED IN PIPE A.
 3. PLACE AUTOMATED MONITORING IN CORRECT LOCATION IN THROAT. ADD GAGE THERE FOR MANUAL MONITORING.
 4. ADD WING WALLS TO THE FLUME. TURBULENCE IN THE SUMP CORNERS SHOULD BE REDUCED.

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GAY DITCH FLUME

3

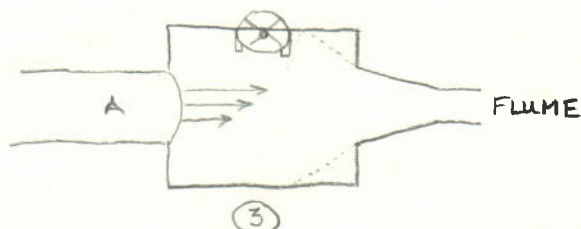
FIELD TESTS

WE PLACED 8 SANDBAGS IN THE BOTTOM OF SUMP (3) TO SIMULATE A RAISED FLOOR.



THE FLOW WAS VISIBLY LESS TURBULENT AND ACCURACY IMPROVED ABOUT 6%. WE EXPECT THAT FILLING IN THE ENTIRE SUMP UP TO THE FLOOR OF THE FLUME WILL IMPROVE THE ACCURACY FURTHER.

- WE MADE SEVERAL ATTEMPTS TO SLOW FLOWS THROUGH THE FLUME BY RESTRICTING FLOW IN PIPE A. AFTER CHATTING WITH GAY DITCH CO-OWNER, JOE SACCO ABOUT PAST FLOODING, THE DIVERSION DAM PROBLEMS AND BEAVER ACTIVITIES AROUND THE INLET TO PIPE A, WE FELT CONCERNS ABOUT FLOOD CONTROL OUTWEIGHED THE POTENTIAL ACCURACY IMPROVEMENTS.
- READING THE FLUME AT EXACTLY $\frac{2}{3}$ INTO THE THROAT IMPROVE THE ACCURACY ANOTHER 1.5%.
- HOLDING SHEET METAL AGAINST THE CORNERS OF SUMP (3) TO SIMULATE WING WALLS VISIBLY REDUCED TURBULENCE THROUGH THE FLUME.



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GAY DITCH FLUME

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DESIGN CONSIDERATIONS

- ON 9/16, GAY DITCH FLOWING AT 2.71 cfs. CURRENT MEASURED USING MARSH MCBIRNEY METER. FIRST AND SECOND CLASS RIGHTS FOR THE DITCH ARE 1.36 + 1.27 cfs. JOE SACCO INDICATED DITCH CO. ALSO OWNS STORAGE WATER. JOE INDICATED TYPICAL FLOWS RUN BETWEEN 1.5 AND 5.5 cfs.
- DIVERSION DAM AND HEADGATE WASH OUT SEVERAL TIMES PER IRRIGATION SEASON. CARBON COUNTY, NOT GAY DITCH CO., OWN THOSE STRUCTURES - PER JOE SACCO. DITCH CO. OWNERS FEEL THAT, TO GET WATER PAST THE DIVERSION, THEY NEED TO KEEP HEAD GATE FULLY OPEN AND KEEP THE DIVERSION WASTE GATE OPEN TO LET OUT HIGH SILT LOADINGS. THEY REGULATE FLOWS USING THE SLUICE GATE INSIDE SUMP (3). IMPROVEMENT(S) TO THE FLUME SHOULD NOT IMPAIR THE OPERATION OF THE SLUICE GATE.
- DOWNSTREAM OF PIPE B IS A SECTION OF OPEN DITCH. A NEW FLUME COULD BE INSTALLED IN THIS SECTION. JOE SACCO MENTIONED THEY ARE LOOKING FOR FUNDING TO HELP PLACE THAT SECTION IN PIPE. THE DITCH RUNS IN AN EASEMENT THROUGH SOME PRIVATE RESIDENCES. DITCH MAINTANCE AND FLOOD DAMAGE HAVE BEEN ISSUES IN THIS SECTION. WE WOULD NEED TO ESTIMATE DITCH LOSS PRIOR TO THE FLUME AND SO, WOULD LOSE ^{POOR} SOME ACCURACY. A NEW FLUME WILL BE COSTLY. ACCESS TO THE OPEN DITCH AREA IS NOT AS GOOD AS IT IS TO THE EXISTING FLUME.

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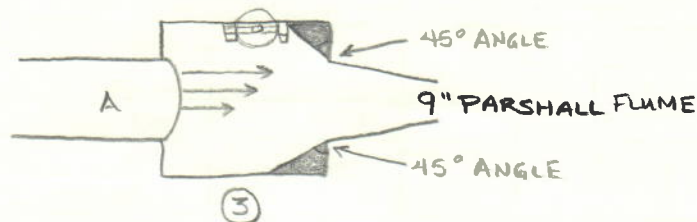
GAY DITCH FLUME

5

RECOMMENDATIONS

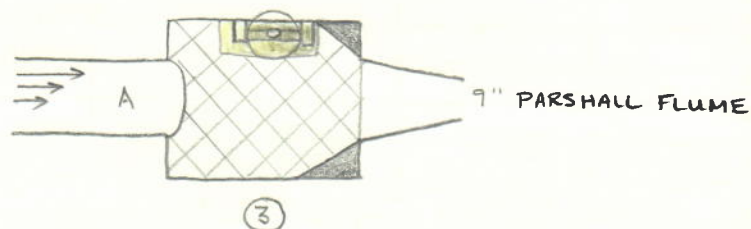
WE SUGGEST THE FOLLOWING IMPROVEMENTS BE MADE TO THE EXISTING FLUME:

- FILL IN CORNERS WITH CONCRETE OR BY BOLTING METAL PLATES. CORNERS SHOULD BE FILLED TO A LEVEL EVEN WITH THE TOP OF THE FLUME.



- - FILL TO A HEIGHT LEVEL WITH THE TOP OF THE PARSHALL FLUME WALLS.

- RAISE THE FLOOR OF THE SUMP UP TO THE LEVEL OF THE FLOOR OF THE PARSHALL FLUME. LEAVE A "WELL" AROUND THE SLUICE GATE SO THAT IT MAY CONTINUE TO BE USED TO REGULATE FLOWS.



- - FILL TO A HEIGHT LEVEL WITH THE TOP OF THE PARSHALL FLUME WALLS.
- ⊠ - FILL TO A HEIGHT LEVEL WITH THE FLOOR OF THE PARSHALL FLUME.
- - DO NOT FILL.

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GAY DITCH FLUME

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RECOMMENDATIONS CONT.

- RE-INSTALL THE FLUME GAGE. THE FLUME STAFF GAGE SHOULD BE LOCATED $23\frac{1}{3}$ " FROM POINT SHOWN BELOW.

